

WELCOME TO THE CLYDE/GREEN SPRINGS TOWN HALL MEETING



Investigation of Potential Clustering of Invasive Cancers among Children, Adolescents and Young Adults in Sandusky County, Ohio, 1996-2006

Comprehensive Cancer Center and James Cancer Hospital and
Solove Research Institute at The Ohio State University

Ohio Cancer Incidence Surveillance System and the
Comprehensive Cancer Program, Ohio Department of Health

May 28, 2009

Conclusions

- Results of the four analyses suggest cancer clustering in the eastern/northeastern portion of Sandusky County, extending into southeastern Ottawa County. The probability of observing these clusters due to chance alone was low.
- **95% Statistical probability that cancer spike was related to external source**

What is the source?



Motives of Our Clients in Filing a Lawsuit



Time Line

Clyde Cancer Childhood Cancer Timeline

Agencies Involved:

- Sandusky County Combined General Health District (SCCGHD)
- Ohio Department of Health (ODH) Chronic Disease and Behavioral Epidemiology Section
- Ohio Department of Health Comprehensive Cancer Control Program
- Ohio Department of Health (ODH) Health Assessment Section (HAS)
- Ohio Department of Health (ODH) Bureau of Radiation Protection (BRP)
- Ohio EPA Northwest District Office (NWDO)
- Ohio EPA Central Office
- Ohio State University James Cancer Hospital and Solove Research Institute
- Agency for Toxic Substances and Disease Registry (ATSDR), Region V Office (Chicago)
- CDC/National Center for Environmental Health (NCEH)
- U.S. EPA Emergency Response Branch, Region V

Background:

November 2007 The Ohio Department of Health (ODH) and the Sandusky County Combined General Health District (SCCGHD) responded to concerns of residents from Clyde City and Green Creek Township regarding a perceived high rate of cancer among residents. SCCGHD and ODH Chronic Disease & Behavioral Epidemiological Section met with the families of the Clyde childhood cancer cases and presented the results of the *Cancer Incidence Among Childhood Residents of Clyde City and Green Creek Township, Sandusky County, Ohio 1996-2006*.¹ The community cancer assessment indicated a higher than expected numbers of childhood cancer cases, mainly brain cancers, in the City of Clyde and in portions of adjacent townships in a largely rural portion of eastern Sandusky County. Families at the meeting expressed concerns about possible environmental contamination and requested the involvement of the Ohio EPA and the ODH Bureau of Environmental Health (BEH).

November 27, 2007 During an ODH Comprehensive Cancer Group meeting, the Chronic Disease & Behavioral Epidemiological Section informed the ODH BEH Health Assessment Section (HAS) representative and Ohio EPA representative that there were families at the Clyde cancer meeting who requested both agencies involvement to address their concerns about possible environmental contamination.

December 5, 2007 A multi-agency conference call with the SCCGHD, ODH Chronic Disease & Behavioral Epidemiological Section, ODH HAS, and the Ohio EPA Northwest District Office (NWDO) took place to begin discussions of how we plan to address the directed environmental concerns.

What Ohio EPA Did.

Based on the data collected from the families it is the conclusion of this assessment that there were no exposures or variables that were common to the 21 children with cancer who participated in this profile.

RECOMMENDATIONS

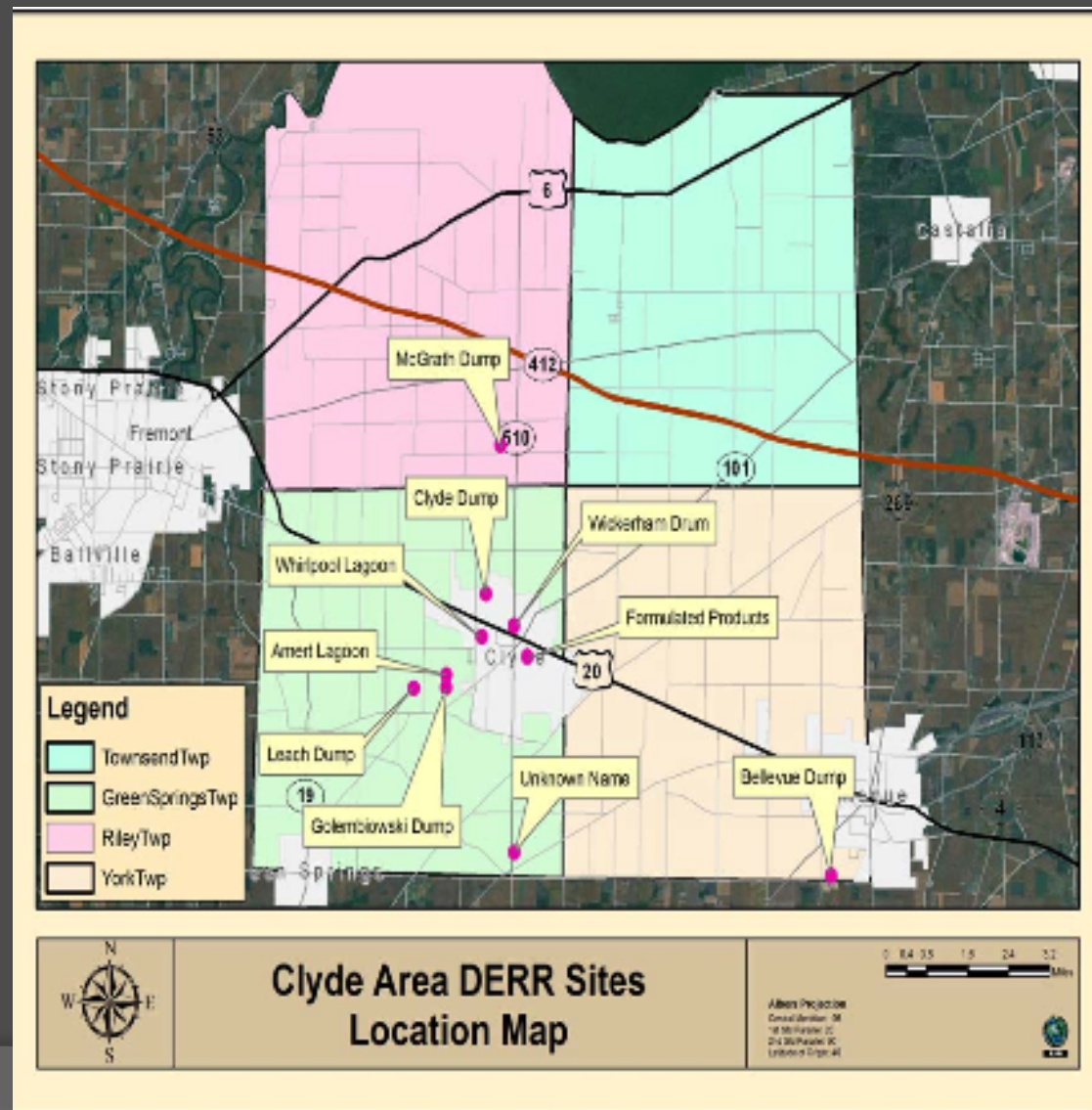
- (1) Share the results of this profile with the parents of the children with cancer.
- (2) Post this profile report on the SCHD and ODH Web sites.

Families said no way and US EPA Got Involved

- Ohio EPA Only Designated Four Dumping Sites Related to Whirlpool



Additional Sites Evaluated



Recent Developments



September 28, 2012 Site Assessment Report for Whirlpool Park Site

**SITE ASSESSMENT REPORT
FOR THE
WHIRLPOOL PARK SITE
GREEN SPRINGS, SANDUSKY COUNTY, OHIO**

NPL STATUS: NON-NPL

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
Region V
25089 Center Ridge Road
Westlake, OH 44145

Prepared by:

WESTON SOLUTIONS, INC.
6779 Engle Road
Suite I
Middleburg Heights, OH 44130

September 28, 2012

Prepared by: *Dustin Bates* Date: 9/28/2012
Dustin Bates
START Project Scientist

Reviewed by: *TJ McFarland* Date: 9/28/2012
TJ McFarland
START Project Manager

EPA Findings From Whirlpool Park – September 28, 2012

- 9.5 foot layer of mottled grayish-black sludge with petroleum odor - p. 4.

Boring WP-B01, located along the south edge of the basketball court, consisted of a 0.5-foot topsoil layer underlain by a 3.5-foot dry, brown clay and silt layer. Approximately 2.5 feet of black sludge fill material lay beneath. A moist, blackish-green clay layer extended below to 8 feet bgs, underlain by a stiff, yellowish-brown clay layer extending to the termination of the boring at 12 feet bgs. PID VOC readings ranged from 5.1 to 5.7 parts per million (ppm) in the 0- to 4-foot-bgs interval and from 0 to 5.1 ppm below 4 feet bgs. A soil sample was collected from the 6- to 8-foot-bgs interval and submitted for laboratory analysis (see Section 4.2).



EPA Findings From Whirlpool Park – September 28, 2012

- 2.5 feet of black sludge fill material- p. 3.



Boring WP-B02, located along the east edge of the basketball court, consisted of a 0.5-foot topsoil layer underlain by a 9.5-foot layer of mottled gray and black sludge fill material with a petroleum odor. Approximately 0.5 foot of moist, mottled gray and black silt and sand with a petroleum odor lay beneath. A moist, gray clay layer extended below to 12 feet bgs, underlain by a dry, mottled brown and orange clay layer extending to the termination of the boring at 16 feet bgs. PID VOC readings ranged from 16 to 28 ppm in the 0 to 10.5-foot-bgs interval and from 2.3 to 4.4 ppm below 10.5 feet bgs. Soil samples were collected from the 2 to 4 foot-bgs interval and from the 10- to 12-foot-bgs interval and submitted for laboratory analysis (see Section 4.2).

EPA Findings From Whirlpool Park – September 28, 2012

- Analytical results for all subsurface soil samples indicated that PCBs and total metals were present in the subsurface soils at levels exceeding the U.S. EPA RSLs for residential properties and exceeding the U.S. EPA requirements for PCB spill cleanup. P. 6.

5. SUMMARY

The tip line complaint included information that the Whirlpool Corporation filled in the area immediately surrounding and under the basketball court in the southeast corner of the Site. The fill material was described as black sludge-like material. Four soil borings (B01-B04) were completed around the basketball court, one on each side of the court. Two soil borings (B05 and B06) were completed near a former playground located southwest of the basketball court, in an area believed to be outside of the fill area. Analytical results for all subsurface soil samples indicated that PCBs were present in the subsurface soil at levels exceeding the U.S. EPA RSLs for residential properties. Analytical results for subsurface soil samples collected from soil borings B02 and B04 indicated that total metals were present in the subsurface soil at levels exceeding the U.S. EPA RSLs for residential properties and PCBs were present at levels exceeding the U.S. EPA requirements for PCB spill cleanup.

EPA Findings from Whirlpool Manufacturing Site



EPA Findings from Whirlpool Manufacturing Site

- PCBs detected about its respective U.S. EPA Regional Screening Level
- Arsenic detected above EPA RSL
- Dichloromethane detected above EPA RSL

APPENDIX L

SITE ASSESSMENT REPORT FOR THE EASTERN SANDUSKY COUNTY DUMPS SITE CLYDE, SANDUSKY COUNTY, OHIO

WHIRLPOOL MANUFACTURING SITE

119 Birdseye Street
Clyde, Ohio 43410
Latitude: 41.3091° North
Longitude: -82.9865° West

June 29, 2012

Total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the samples collected, at concentrations ranging from 1.3 to 12 mg/kg. One SVOC, 1,1-dichloroethane, was detected above the U.S. EPA RSL at a concentration of 3.8 mg/kg in soil boring WM-B01 at a depth of 8 to 10 ft bgs. Black staining was noted in the soil at this depth, where the 1,1-dichloroethane was detected. Finally, PCB Aroclor 1254 was detected above its respective U.S. EPA RSL at a concentration of 0.32 mg/kg in soil boring WM-B01 at a depth of 10 to 12 ft bgs. No other analytes were detected above their respective RSLs.

EPA Required Nothing!!



C. EPA Findings From Golembiowski Dump Site – June 29, 2012.



APPENDIX E
SITE ASSESSMENT REPORT
FOR THE
EASTERN SANDUSKY COUNTY DUMPS SITE
CLYDE, SANDUSKY COUNTY, OHIO

GOLEMBIOWSKI DUMP SITE

County Road 179
Clyde, Ohio 43410
Latitude: 41.2982° North
Longitude: -83.0006° West

June 29, 2012

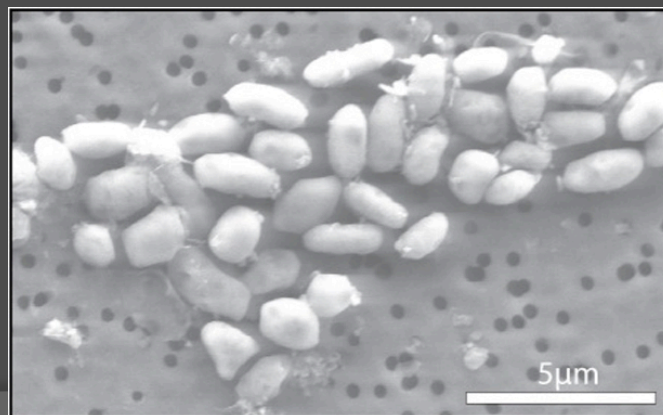
EPA Findings From Golembiowski Dump Site – June 29, 2012, p. 11

- “Soil sample results indicated that arsenic was present above the RSL in all of the soil samples.”

4. CONCLUSIONS

The tasks completed as part of this Site Assessment were designed to document the distribution and concentrations of potential contaminants at the Site. A total of seven soil borings and one soil vapor probe were installed at the Site, and samples were collected for analysis at an off-site laboratory. In addition, a sample was collected from one temporary groundwater monitoring well and sent to an off-site laboratory for analysis.

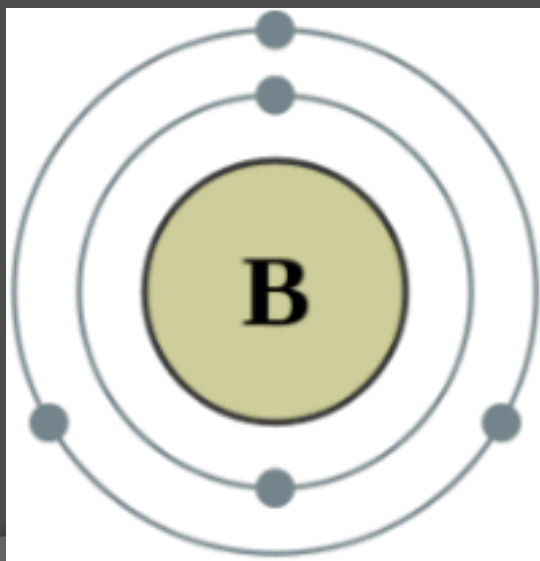
Site assessment activities to date have included the collection of soil, groundwater, and soil vapor samples. Soil sample results indicated that arsenic was present above the RSL in all of the soil samples, at all depths sampled. The shallowest soil samples collected at the Site were at a



EPA Findings From Golembiowski Dump Site – June 29, 2012, p. 12

- “Boron was detected at a concentration of 2.3 mg/L.”

However, boron was detected at a concentration of 2.3 mg/L. An MCL has not been established for boron, nor has Ohio EPA established a Generic Criteria for boron. A nearby state, Michigan, has a Residential Drinking Water criterion of 0.5 mg/L and a Nonresidential Drinking Water criterion of 0.5 mg/L, with a footnote indicating that the criterion is based on adverse impacts to plant life and phytotoxicity. In addition, Michigan has a Groundwater Surface Water Interface



EPA Required Nothing!!



D. EPA Findings From Clyde City Dump Site – June 29, 2012.



APPENDIX C

SITE ASSESSMENT REPORT
FOR THE
EASTERN SANDUSKY COUNTY DUMPS SITE
CLYDE, SANDUSKY COUNTY, OHIO

CLYDE CITY DUMP SITE

McPherson Highway
Clyde, Ohio 43410
Latitude: 41.3021° North
Longitude: -82.9853° West

June 29, 2012

EPA Findings From Clyde City Dump Site – June 29, 2012, pp. 10-11.

Soil and ground water samples
show levels above the EPA
Screening Level for:

1. Arsenic
2. PCBs
3. Boron
4. Antimony
5. Cadmium
6. Cobalt
7. Iron
8. Lead
9. Manganese

Total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the samples collected, at concentrations ranging from 3.5 to 52 mg/kg. Antimony, cadmium, cobalt, iron, lead, and manganese were detected above their respective RSLs primarily at CD-B04 (10 to 12 ft). In addition, PCB Aroclor 1254 was detected above the

EPA Required Nothing!!



What Information Whirlpool is disseminating



WHIRLPOOL CORPORATE | MEDIA | 1-888-923-9745

[HOME](#) [FACTS](#) [FAQS](#) [IN THE COMMUNITY](#) [CONTACT](#)

FACTS

Whirlpool Corporation and our people have been a part of the Clyde community for over 60 years, and we sympathize with the families who are concerned about possible health issues in our area. We have over 3,000 people going to work with us every day in Clyde. We live here, too, and we are also very eager to learn as much as we can about the health questions that are being raised.

Background

The U.S. Environmental Protection Agency investigated an area of the former Whirlpool Park that may have been filled with dirt from elsewhere more than 50 years ago. The investigation discovered the presence of a contaminant. There is no evidence that the contaminant moved off the site. We have been working with the U.S. EPA, the Ohio EPA, and the current property owner to determine the extent and, if possible, the source of the contamination.

General information

- Whirlpool purchased the site known then as Whirlpool Park in 1953 for use as a park for employees and their families and friends.
- The park was closed in 2006 and sold to a private owner in 2008.
- We do not know where the contaminant at the former Whirlpool Park site came from or how it got there.
- Whirlpool never authorized any dumping of contaminants at the site.
- Whirlpool was notified of the contaminant issue at the former Whirlpool Park site by the U.S. EPA in July 2012.

What we know about the situation

- Samples taken from the property at the former Whirlpool Park showed a contaminant was found at depths at which people would not have been exposed.
- Sampling and environmental reviews were conducted on current Whirlpool Clyde facilities separately from the former Whirlpool Park. Samples from the Whirlpool Clyde facilities showed no contaminants.
- U.S. EPA analysis of a neighboring well found no contaminant.

Samples from
Whirlpool Clyde
Facilities Showed no
contamination

Removal Action not Warranted

What we know about the situation

- Samples taken from the property at the former Whirlpool Park showed a contaminant was found at depths at which people would not have been exposed.
- Sampling and environmental reviews were conducted on current Whirlpool Clyde facilities separately from the former Whirlpool Park.
- Based on the assessments and information U.S. EPA obtained in its investigation of the Whirlpool manufacturing facility, the agency determined “that removal action was not warranted.”

EPA Findings from Whirlpool Manufacturing Site



Whirlpool Changed Its Webpage



WHIRLPOOL CORPORATE | MEDIA |  1-888-92

[HOME](#)

[FACTS](#)

[FAQS](#)

[IN THE COMMUNITY](#)

[ACTION PLANS](#)

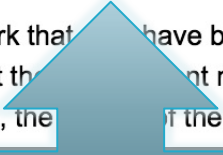
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Contaminate (no
mention of
PCBs)

EPA Findings From Whirlpool Park – September 28, 2012

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Why are these findings significant?

Polychlorinated Biphenyls (PCBs)

TEACH Chemical Summary



U.S. EPA, Toxicity and Exposure Assessment for Children's Health

This TEACH Chemical Summary is a compilation of information derived primarily from U.S. EPA and ATSDR resources, and the TEACH Database. The TEACH Database contains summaries of research studies pertaining to developmental exposure and/or health effects for each chemical or chemical group. TEACH does not perform any evaluation of the validity or quality of these research studies. Research studies that are specific for adults are not included in the TEACH Database, and typically are not described in the TEACH Chemical Summary.

Carcinogenicity Weight-of-Evidence Classification⁷: PCBs are classified by the U.S. EPA as B2, probable human carcinogens, based on liver tumors in adult rats (<http://www.epa.gov/iris/subst/0294.htm>, II.A.1) (127). The World Health Organization International Agency for Research on Cancer (IARC) in 1998 classified PCBs as Group 2A, probably carcinogenic in humans (<http://monographs.iarc.fr/ENG/Monographs/vol18/volume18.pdf>) (128).

Why are these findings significant?

ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

ARSENIC
CAS # 7440-38-2

Division of Toxicology and Environmental Medicine ToxFQA's™

August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- ☐ Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- ☐ Arsenic cannot be destroyed in the environment. It can only change its form.
- ☐ Rain and snow remove arsenic dust particles from the air.
- ☐ Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- ☐ Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- ☐ Ingesting small amounts present in your food and water or breathing air containing arsenic.
- ☐ Breathing sawdust or burning smoke from wood treated with arsenic.
- ☐ Living in areas with unusually high natural levels of arsenic in rock.
- ☐ Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

Why are these findings significant?

Agency for Toxic Substances and Disease Registry Case Studies in Environmental Medicine (CSEM) Chromium Toxicity

Course: **WB 1466**

Original Date: **December 18, 2008**

Expiration Date: **December 18, 2011**

Agency for Toxic Substances and Disease Registry Case Studies in Environmental Medicine (CSEM)

Chromium Toxicity

Key Points

- Chromium exists in three common stable valence states: chromium (0), (III), and (VI).
- Cr(III) is an essential dietary nutrient. Its deficiency in the body has been associated with diabetes, infertility, and cardiovascular disease.
- Cr(VI) is carcinogenic.
- The metallurgical, chemical, and refractory industries are the fundamental users of chromium.

Why does this cause concern?

- Could be a common source for the cluster:

“A pregnant woman can pass these chemicals to her unborn child.”



http://nlquery.epa.gov/epasearch/epasearch?querytext=PCP+fetus&fld=&areaname=&areacontacts=&areasearchurl=&typeofsearch=epa&result_template=epafiles_default.xsl&filter=sample4filt.htm
<http://www.idph.state.il.us/envhealth/factsheets/polychlorinatedbiphenyls.htm>
www.fdlco.wi.gov/Modules/ShowDocument.aspx?documentid=675

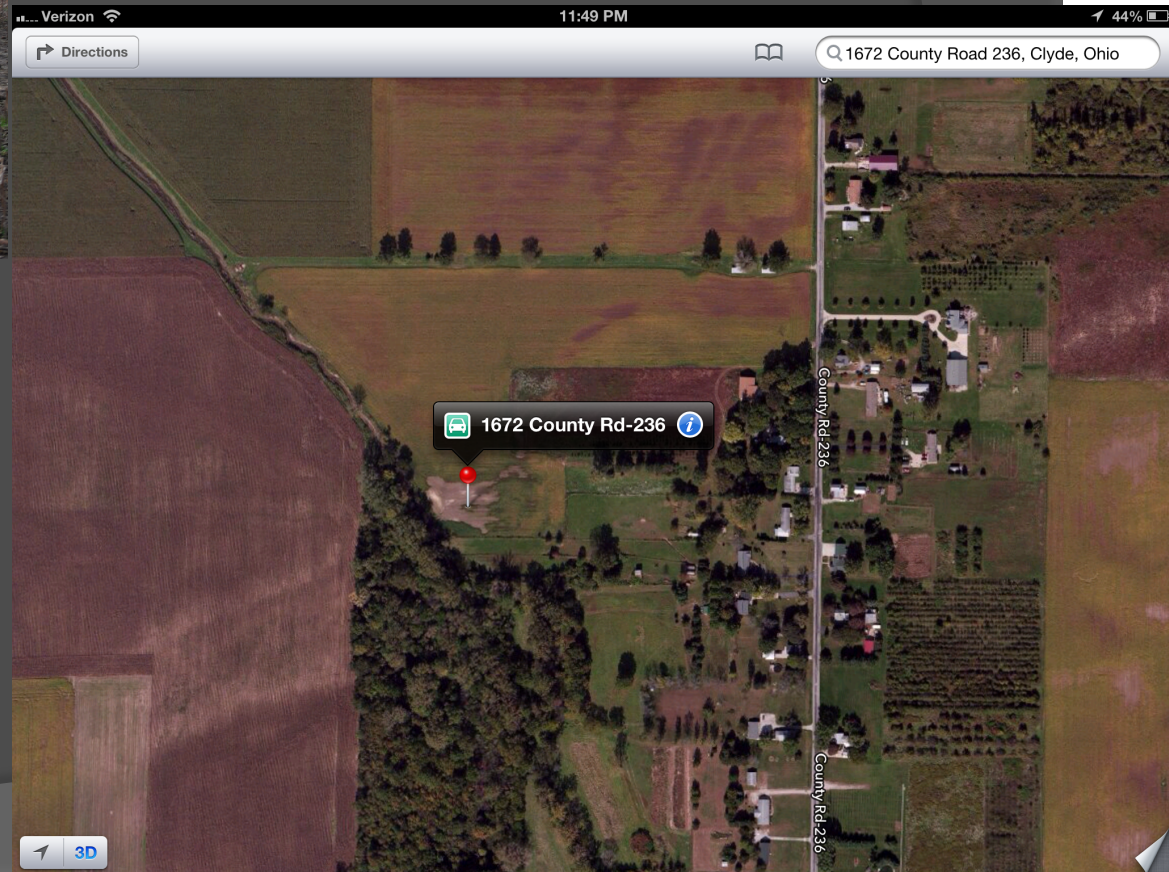
Other dump sites cause same concerns.



Leach Dump



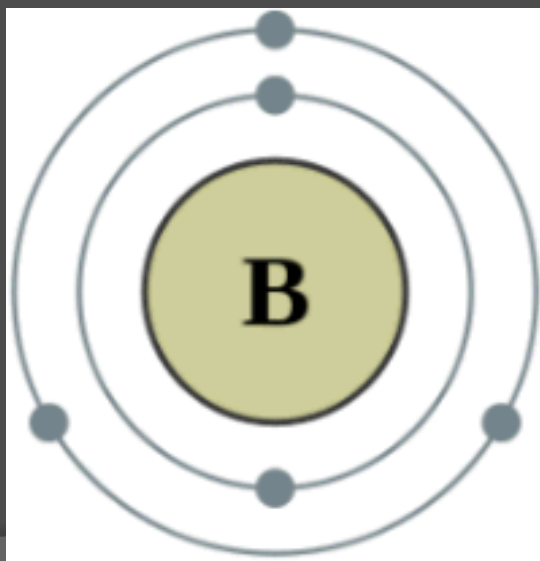
Leach Dump



EPA Findings From Golembiowski Dump Site – June 29, 2012, p. 12

- “Boron was detected at a concentration of 2.3 mg/L.”

However, boron was detected at a concentration of 2.3 mg/L. An MCL has not been established for boron, nor has Ohio EPA established a Generic Criteria for boron. A nearby state, Michigan, has a Residential Drinking Water criterion of 0.5 mg/L and a Nonresidential Drinking Water criterion of 0.5 mg/L, with a footnote indicating that the criterion is based on adverse impacts to plant life and phytotoxicity. In addition, Michigan has a Groundwater Surface Water Interface



Nonresponsive

Nonresponsive

Nonresponsive

Nonresponsive

Nonresponsive

Nonresponsive

Nonresponsive

Nonresponsive

INTERESTING DISCOVERY



FOUND BARRELS OF PTFE

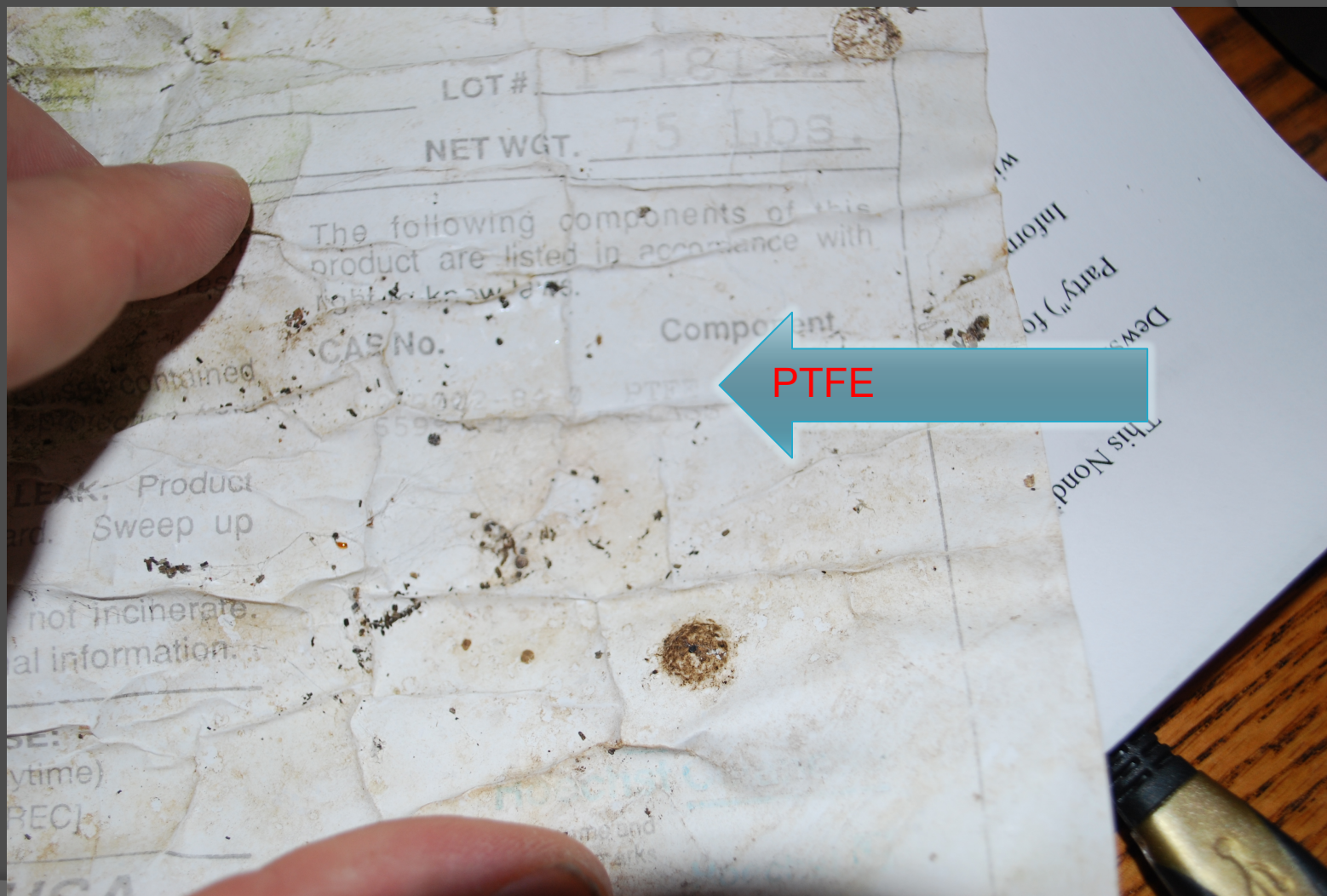
BARRELS



Barrel



PTFE (Polytetrafluoroethylene)



PTFE



Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers

<http://www.epa.gov/chemicalsafety/pfoa/>
Last updated on Wednesday, 11/11/2015 10:11 AM

You are here: [EPA Home](#) [Chemical Safety and Pollution Prevention](#) [Pollution Prevention](#)
Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers

Perfluorooctanoic acid (PFOA) is a long-chain perfluorinated chemical (LCPFC) that does not occur naturally in the environment. LCPFCs are synthetic chemical substances with special properties and hundreds of manufacturing and industrial applications.

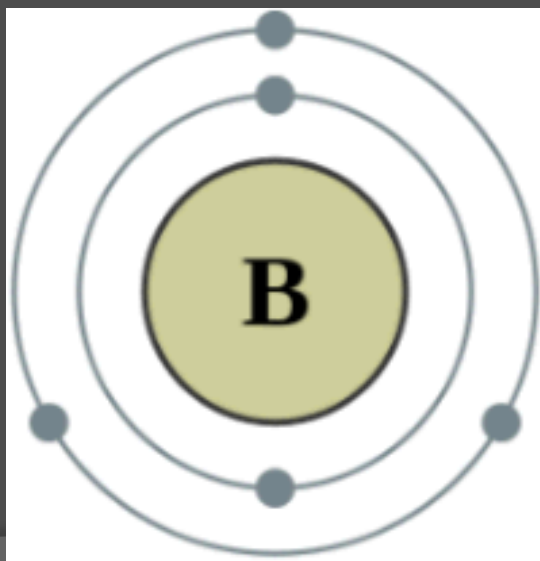
EPA has been investigating PFOA because it:

- Is very persistent in the environment
- Is found at very low levels both in the environment and in the blood of the general U.S. population
- Remains in people for a very long time
- Causes developmental and other adverse effects in laboratory animals.

EPA Findings From Golembiowski Dump Site – June 29, 2012, p. 12

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PTFE



Perfluorooctanoic Acid (PFOA) and Fluorinated Telomers

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BENZALDEHYDE WAS FOUND IN ATTIC DUST TESTING



BENZALDEHYDE IS A HAZARDOUS SUBSTANCE AS DEFINED BY EPA

Benzaldehyde

NTIS Summary of Benzaldehyde Health Effects:

<http://www.ntis.gov/search/product.aspx?ABBR=PB88174537&starDB=GRAHIST>

Worker exposure limits for benzaldehyde:

CAS# 100-52-7: CU4375000

LD50/LC50:

CAS# 100-52-7:

Draize test, rabbit, skin: 500 mg/24H Moderate;

Oral, mouse: LD50 = 28 mg/kg;

Oral, mouse: LD50 = 2020 mg/kg;

Oral, rat: LD50 = 1300 mg/kg;

Oral, rat: LD50 = 2400 mg/kg;<br.

BENZALDEHYDE SUSPECTED CARCINOGEN



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZALDEHYDE**

CAS Number: 100-52-7
DOT Number: UN 1990

RTK Substance number: 0196
Date: July 1996 Revision: July 2002

HAZARD SUMMARY

- * Benzaldehyde can affect you when breathed in and by passing through your skin.
- * Benzaldehyde may cause mutations. Handle with extreme caution.
- * Breathing Benzaldehyde can irritate the nose and throat causing coughing and shortness of breath.
- * Contact can irritate the skin and eyes, and repeated exposure can cause a skin rash to develop.
- * Exposure can cause you to feel dizzy and lightheaded. Higher levels can cause seizures and passing out.
- * Benzaldehyde may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.

IDENTIFICATION

Benzaldehyde is a colorless to yellowish liquid with a bitter almond odor. It is used to make dyes, flavors and perfumes, and as a solvent.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
- * **ODOR THRESHOLD = 0.042 ppm.**
- * The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Benzaldehyde**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

- * Benzaldehyde may cause mutations. All contact with this chemical should be reduced to the lowest possible level.
- * It should be recognized that **Benzaldehyde** can be absorbed through your skin, thereby increasing your exposure.

BENZALDEHYDE SUSPECTED CARCINOGEN

Drug and Chemical Toxicology, 30:1–16, 2007
Copyright © Informa Healthcare
ISSN: 0148-0545 print / 1525-6014 online
DOI: 10.1080/01480540601017603

informa
healthcare

DNA–Protein Cross-link Formation in Burkitt Lymphoma Cells Cultured with Benzaldehyde and the Sedative Paraldehyde

J. R. Kuykendall,¹ E. J. Jarvi,² B. L. Finley,³
and D. J. Paustenbach³

¹ChemRisk, Boulder, Colorado, USA

²College of Pharmacy, Ferris State University, Big Rapids, Michigan, USA

³ChemRisk, San Francisco, California, USA



The Carcinogenic Potency Project



Benzaldehyde (CAS 100-52-7)

[SMILES](#), [InChI](#) and [Structure](#) are below.

Rats and Mice: Cancer Test Summary

Rat Target Sites		Mouse Target Sites		TD ₅₀ (mg/kg/day)	
Male	Female	Male	Female	Rat	Mouse
no positive	no positive	sto	sto	no positive	1490 ^m

Key to the Table Above



GENOTOXICITY OF BENZALDEHYDE IN *Drosophila melanogaster* USING THE WING SOMATIC MUTATION AND RECOMBINATION TEST (SMART) AND PROTEIN PROFILING

DEEPA P.V.*, PRIYANKA V., SWARNA R. AND AKSHAYA S.

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Abstract- Benzaldehyde (C_6H_5CHO) is an organic compound which finds a range of applications in many industries. Benzyl derivatives are food additives, used for increasing the taste of food and beverages. It is therefore important to evaluate its genotoxicity and assign the threshold concentration that is permissible for inclusion in edible items. The present study investigated the genotoxic effect of benzaldehyde on *Drosophila melanogaster*. Two day-old adult males and 3rd instar larvae of *Drosophila melanogaster* were exposed to varying concentrations of the chemical by allowing them to feed on media, containing benzaldehyde. The treated series were compared to the control group (media mixed with distilled water). Our results demonstrated that benzaldehyde induced genotoxic and mutagenic effects. Benzaldehyde caused increased incidence of mutated phenotypes including orange discoloration of thorax and abdomen that was carried over to the F1 generation. The flies lost their viability at higher concentrations of the drug. To assess the phenotypic mutations at the molecular level, protein profiles of the extracts obtained from 3rd instar larvae from control and drug exposed were compared by SDS PAGE. The protein profiling results demonstrated changes in several major proteins. The Wing Somatic Mutation and Recombination Test (SMART) was used to assess the degree of genotoxicity, by evaluating mitotic recombination and mutations. Trans-heterozygous larvae obtained from the crossing of multiple wing hair and flare (*mwh/fir3*) were subjected to various concentrations of benzaldehyde. Wing analysis showed single spots that represent mutated *fir3* clone and twin spots for mutated *mwh* clone.

Keywords- Genotoxicity, benzaldehyde, wing spot test/SMART, mutagenicity, SDS PAGE, *in-vivo*, *Drosophila melanogaster*.

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Introduction

The extensive knowledge of the genetics of *D. melanogaster* and the long term experimental experience with this organism together with extensive genetic homology to mammals has made it uniquely useful in mutation research and genetic toxicology. Many *Drosophila* genes are homologous to human genes and are studied to gain a better understanding of what role these proteins have in human beings. Apart from being one of the genetically best characterized multicellular eukaryotes, many hundreds of thousands of offspring can be generated in a relatively short period of time (2

weeks at 25°C), easy to maintain and the complete spectrum of somatic and heritable alterations can be detected under the microscope with low power magnification. The examination of the mutants can be done in large numbers and significant data can be collected to demonstrate consistence [1].

Genotoxicity describes a deleterious action on a cell's genetic material affecting its integrity. Genotoxic substances are known to be potentially mutagenic or carcinogenic, specifically those capable of causing genetic mutation and of contributing to the development of tumors. These genotoxic substances include a variety of

BENZALDEHYDE IS FIRST SUBSTANCE OF COMMONALITY AMONGST THE CHILDREN



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ALAN W. MORTENSEN
ALSO ADMITTED IN
WYOMING
COLORADO

April 10, 2013

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246 North High Street
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Commissioner David. G. Pollick
Sandusky County Health Department
2000 Countryside Drive
Fremont, Ohio 43420

Re: Clyde Ohio Cancer Cluster

Dear Directors, Directors, Commissioner and Counsel:

As some of you know, several of the families of victims of the childhood cancer cluster have retained us to investigate the many unanswered questions of this matter. As part of this investigation, we retained an environmental engineer, Joel Hebdon, to perform some dust particulate testing in the attics of some of the families' homes and one home that had no children in it. I am attaching a copy of Mr. Hebdon's protocol. *See Attachment One.*

The testing results have come back. High levels of benzaldehyde were found in every single home that was tested, from a home that was ten years old to a home that is over 100 years old. The levels were for the most part very consistent, which indicates that the production of this dust occurred in the past ten years. No benzaldehyde was found in the water treatment plant, which indicates that what ever was producing the benzaldehyde dust has likely not produced any in the past few of months. *See Attachment Two.*

EPA RESPONSE



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

APR 30 2013

REPLY TO THE ATTENTION OF:

S-6J

Mr. Alan W. Mortensen
Dewsnup, King, & Olson
36 South State Street
Suite 2400
Salt Lake City, Utah 84111

Dear Mr. Mortensen:

Thank you for your April 10, 2013 letter regarding sites of potential environmental contamination in eastern Sandusky County, Ohio. I am responding on behalf of the various parties at the U.S. Environmental Protection Agency that received your letter, including Acting Administrator Bob Perciasepe.

EPA has already reviewed and approved the Whirlpool Park site work plans provided by the potentially responsible party. This will enable work to begin in the coming months. EPA will oversee this expanded site assessment work, which will include taking over 360 samples from the site. EPA will continue to keep the community updated through our project website: <http://www.epa.gov/Region5/cleanup/easternsandusky>.

With respect to your questions regarding dust sampling in the attics of area homes, EPA will review the information you provided and discuss your findings with public health agencies.

URGENCY

1. CLIENTS WANT TO CLEAN ATTICS
2. WHIRLPOOL DESERVED A CHANCE TO TEST BEFORE THE CLEANING SO WE NEEDED TO FILE THE LAWSUIT.
3. REJECTED IT
4. THEN ATTICS CAN BE CLEANED
5. INVITE WHIRLPOOL TO PAY FOR CLEAN UP



Bureau of
Environmental Health
Health Assessment Section

"To protect and improve the health of all Ohioans"

Benzaldehyde

Answers to Frequently Asked Health Questions

What is benzaldehyde?

Benzaldehyde is a colorless, aromatic liquid that has a pleasant almond-like odor. It quickly evaporates (turns from a liquid to a gas) upon exposure to the air.

How is benzaldehyde used?

Benzaldehyde is mainly used as a food and flavoring additive and can be found in many foods, including baked goods, frozen dairy, fruit juice, soft candy, gelatin pudding, non-alcoholic beverages, alcoholic beverages, hard candy, and chewing gum [Fenaroli, 2005].



Benzaldehyde is also used in dyes, fragrances (perfumes, deodorants, etc.), pharmaceuticals (drugs), personal care items (shave gels, moisturizing gels/creams, bath soaps, etc.), as artificial flavoring (cherry and almond flavors), and as an additive for one or more types of tobacco products. It is also used as a solvent for oils, resins, and cellulose fibers.



Where do you find benzaldehyde in the environment?

Everywhere. Benzaldehyde is naturally found in almonds, apples, peaches, cherry and apricot kernels, and other *Prunus* species (fruits that have pits). Benzaldehyde can also be naturally found in essential oils including hyacinth, citronella, orris, cinnamon, sassafras, labdanum ("rock rose") and patchouli (type of mint) [Fenaroli, 2005]. Benzaldehyde has also been found in melon, grapes, tea and whisky [Leffingwell, 1998]. Benzaldehyde can also be found in combustion by-products in car and truck exhaust, wood fires and tobacco smoke.

A Swedish study of indoor dust detected benzaldehyde in 373 out of 389 homes. This suggests that the occurrence in the home would reflect its widespread use in household products. (Nilsson et al, 2005).



What happens to benzaldehyde in the environment?

Benzaldehyde is not a persistent chemical, meaning it does not stay long in the environment. If released to the atmosphere, benzaldehyde is broken down quickly by the air and sunlight and has a half-life of about 30 hours. Benzaldehyde can be carried as dust particles in the air and can be removed by rain and fallout. If released to soil or water, it is expected to biodegrade [Hazardous Substance Data Bank – HSDB].

<http://www.cdc.gov/niosh/ipcsneng/neng0102.htm>

- Personal protection: filter respirator for organic gases and vapors. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.

How does benzaldehyde affect your health?

Benzaldehyde is considered to be a Generally Regarded As Safe (GRAS) food additive in the United States by the FDA and is accepted as a flavoring substance in the European Union. The Environmental Working Group (EWG), Skin Deep Cosmetic Database lists benzaldehyde overall chemical hazard on the low end of the hazard scale.

What happens to benzaldehyde in your body?

Benzaldehyde can be absorbed through skin and/or lungs and is then distributed to high blood flow organs. After being metabolized to benzoic acid, it is naturally removed in the urine. It does not bio-accumulate (build up) in any specific tissue type and there was little acute (immediate) toxicity seen in laboratory studies.

Health effects:

Carcinogenicity and Mutagenicity

Benzaldehyde was evaluated by the National Toxicology Program (NTP), which found no evidence of carcinogenicity in rats, and some evidence of tumorigenicity in mice (non-malignant, benign tumors – or non-cancerous tumors). NTP does not list benzaldehyde as either a *Known* or *Reasonably Anticipated* human carcinogen (Report on Carcinogens, Twelfth Edition 2011).

Dermal Toxicity

Based on the examination of the available laboratory data and a detailed consideration of the chemistry involved in dermal reactions, Patlewicz *et al.*, (2001) concluded that benzaldehyde was not a skin-sensitizer.

Reproductive and Developmental Toxicity

In assessing the teratogenic (causing malformations of an embryo or fetus) potential of benzaldehyde, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) concluded, "...the data reviewed were sufficient to demonstrate a lack of teratogenic and reproductive potential" [JECFA, 2002]

Has the government made recommendations to protect human health?

The Agency for Toxic Substances and Disease Registry (ATSDR) comparison values (CVs) for benzaldehyde in residential soils are 5,000 part per million (ppm) for a child and 70,000 ppm for an adult. These are levels a person can be exposed to without negative health effects.

The U.S. EPA Regional Screening Level (RSL) for benzaldehyde is 7,800 ppm for residential soils and 100,000 ppm for industrial soils.

References

Environmental Working Group (EWG), Skin Deep Cosmetic Database, 2013

Fenaroli (2005) *Fenaroli's Handbook of Flavor Ingredients*, 5th Edition, Volume II, CRC Press, London

JECFA, (2002). Safety evaluation of certain food additives and commitments. Prepared by the 57th meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA)

Leffingwell, (1998). GRAS flavour chemicals report (database system). Leffingwell and Associates

Patlewicz *et al.*, (2001). Skin-sensitization structure-activity relationships for aldehydes. *Contact Dermatitis*. **44**, 331-336

National Library of Medicine TOXNET Hazardous Substances Data Bank (HSDB) <http://toxnet.nlm.nih.gov/>

National Toxicology Program, CASRN:100-52-7 <http://ntp-server.niehs.nih.gov/>

Nilsson *et al.*, Environment International 31 (2005) 1141 – 1148

US Department of Health and Human Services, Household Products Database, 2013

Where can I get more information?

Ohio Department of Health
Health Assessment Section
246 N. High Street
Columbus, Ohio 43215
Phone: (614) 466-1390



5,000 ppm for child and 70,000 ppm for an adult in residential soils.
7,800 ppm for residential soils and 100,000 ppm for industrial soils

BENZALDEHYDE WAS FOUND
IN ATTICS IN VERY HIGH
AMOUNTS (1,290,000 and
6,220,000 ppb or 129,000 and
622,000 ppm)

Table 3 (continued). Analytical Summary

Compound	Units	Mead	Clyde Ohio Analytical Results			
			Brown	Donnersbach	Keller Rental	
Aroclor 1016	ug/kg-wet	ND	ND	ND	ND	
Aroclor 1221	ug/kg-wet	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg-wet	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg-wet	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg-wet	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg-wet	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg-wet	ND	ND	ND	ND	ND
Benz(a)anthracene	ug/kg-wet	ND	ND	ND	ND	5.68E+03
Benzaldehyde	ug/kg-wet	1.84E+04	1.95E+04	1.29E+04	6.22E+04	1.41E+04

Whirlpool Claims Not Used in Core Process. What About Cleaning and Lubrication Process?

- ◉ ChemKleen?
- ◉ Finishing Tech, Inc. Multan F747?
- ◉ Dow Frost?

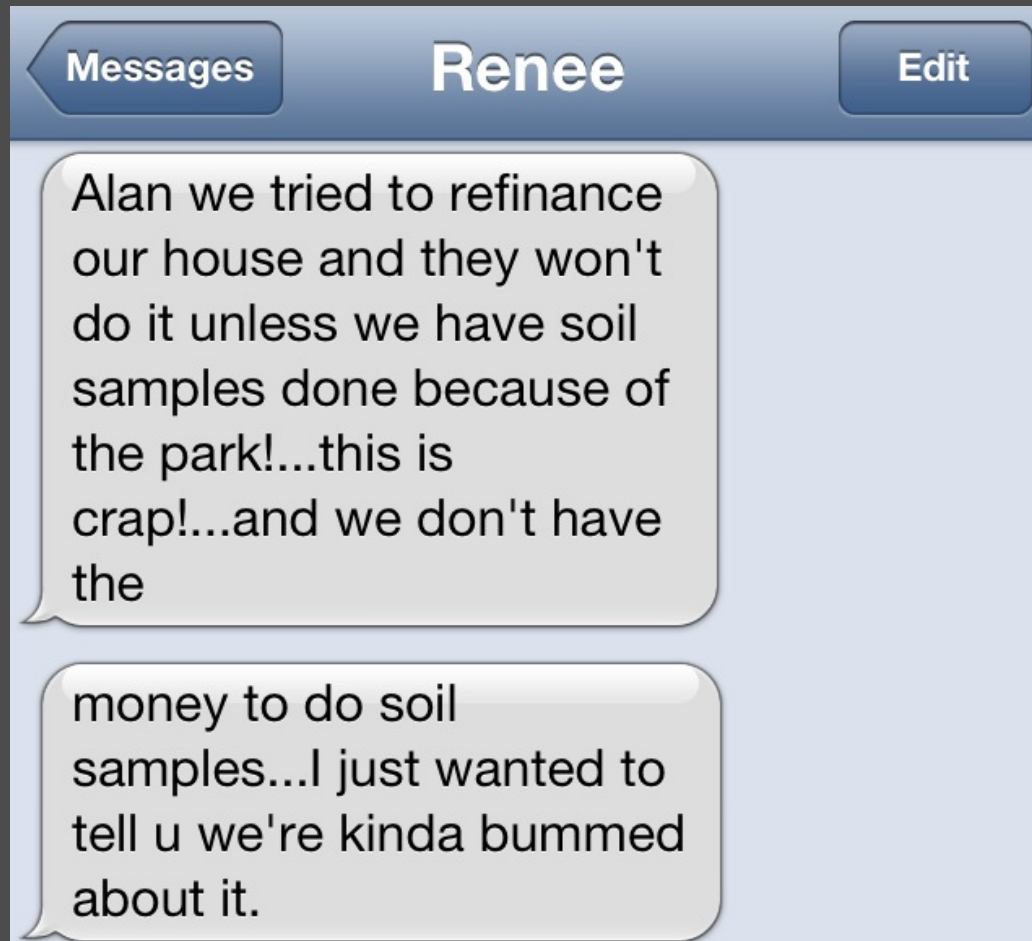
Stigma Associated with Hazardous Waste Sites and Diminution of Property Value



Decreased Property Values Associated with Hazardous Sites

- Peer-reviewed technical literature documents how property values relate to environmental factors such as proximity to hazardous waste sites.
- Stigma associated with perception of risk and proximity to hazardous waste sites, or other negative environmental factors, is known to adversely impact property values and enjoyment of property.

Farley Home



TESTING RESULTS POTENTIALLY DEVASTATING TO PROPERTY OWNERS IN EASTERN SANDUSKY



Need a Hazmat Team To Clean Your Attic



Testing Costs Around \$3,000



Evidence of Stigma from Public Comments on News Articles

Barbra Buskirk Sherwood · Ohio University

Yes, only about 5 miles from my parents and our soon to be home...scary!

November 14, 2012 at 8:28am

Whitney Hayes Carter

It has been going on for years Clyde.....Im shocked people are still living there. So sad! There are alot of rare cancer cases in Tiffin too.....I will not drink the water when we go home :(Its awful

November 14, 2012 at 8:11am

Shane Johnson

My family has been working at Whirlpool for decades, and I was once a security guard at the main plant, as well as at Whirlpool Park for a few months... I think it's incredibly callous and downright criminally negligent for Whirlpool to cover this up... I'm sure they will place the blame on one person, and claim they had no knowledge of the dumping... God only knows what nasty things are coursing through my veins now, and what I may have passed on to my children...

Justice needs to be done, and swiftly!

November 14, 2012 at 2:37pm

Stephanie Saunders Grover · Fremont Vfw

What this article has failed to mention is this is only one of many dump sites like this! There have been at least 2 others in clyde already...have you never noticed the large fenced in wooded area on 213 (right before 236) and one other on 236 that I personally watched them take thousands on tons of contaminated dirt off the property along without 50gal drums rusted from being burried for 40 years!! But I can bet noone will here about that..since whirlpool required gag orders on the families who lived on the properties!!

November 15, 2012 at 9:15am

Bud Shaull · Cook/Waiter at Track's End

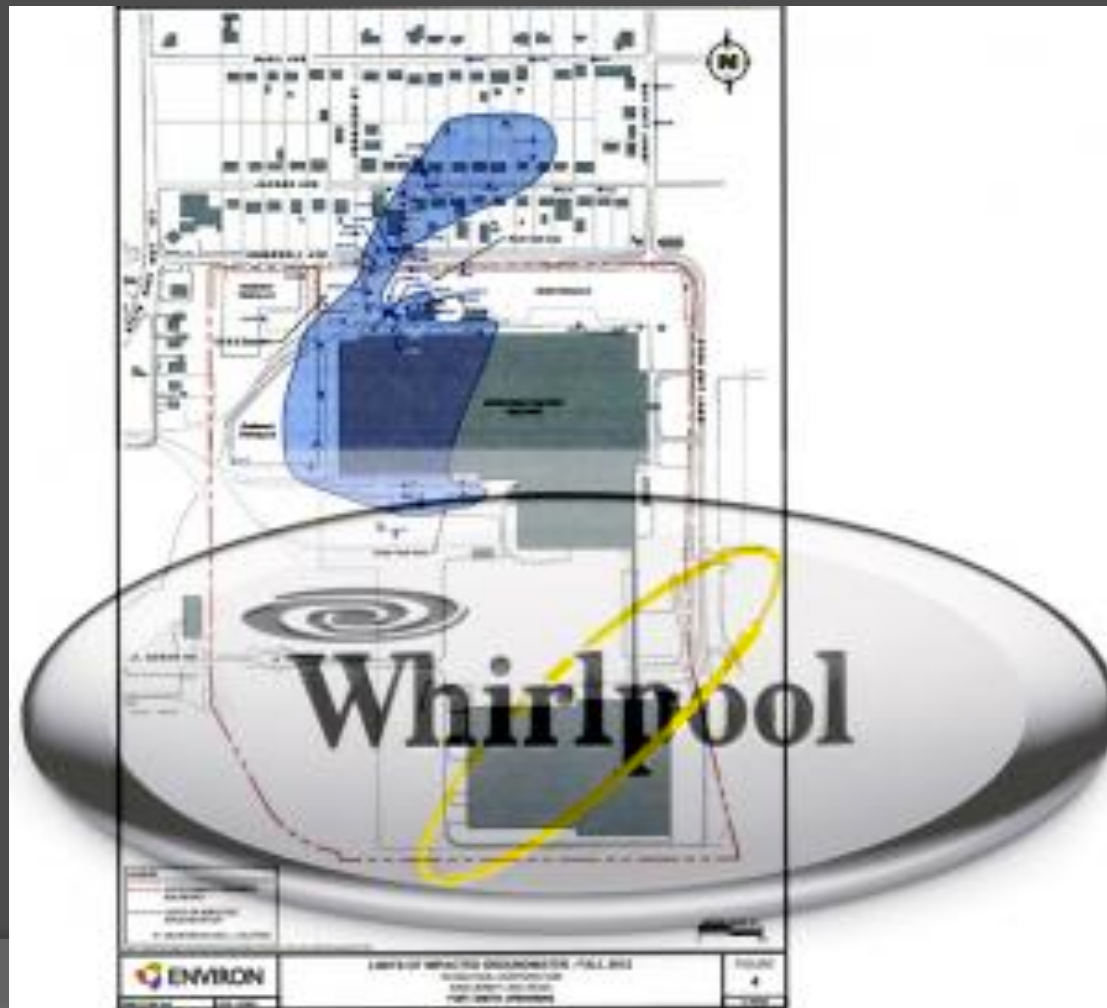
I Hope They All Goto Jail And Pay For It....Whirlpool Ruined My Life And Killed My Mother Plus Tons Of Other People And Children.

November 15, 2012 at 4:32am

People say we want to make
Clyde a Ghost Town (Fort Smith,
Arkansas)



Whirlpool, which closed its Fort Smith refrigerator plant in June 2012 and moved work to Mexico, trichloroethylene, a known carcinogen, leaked into groundwater at the plant site, then into a neighborhood to the north. Whirlpool used the chemical as a solvent from the late 1960s to the early 1980s.



- FORT SMITH, Arkansas — A collection of homeowners and landlords have filed lawsuits targeting the Whirlpool Corp., worried that their property values have suffered because a degreasing solvent used at a recently shuttered plant leaked near a neighborhood more than a generation ago.

www.cancerclusterclyde.com

